Sea surface temperature and heat budget variability in ECCO2

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ECCO2 meeting, Boston

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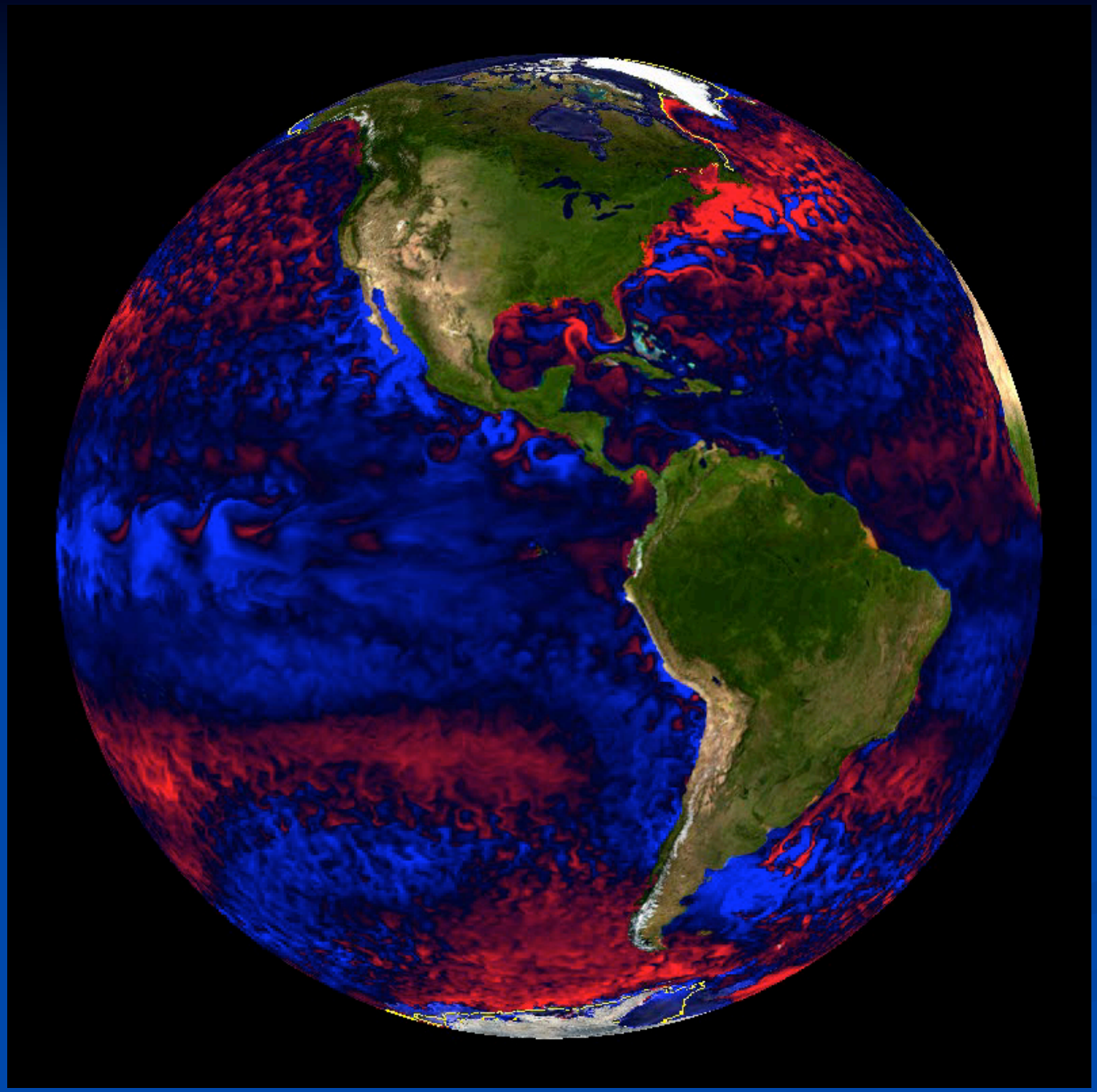

SST anonalies

Mixed layer heat budget and SST

$$\frac{\partial T}{\partial t} = \frac{1}{h}\frac{Q}{\rho C_p} - \frac{1}{h}\frac{\partial h}{\partial t}\Delta T + \text{advection} + \text{diffusion}$$

Project Questions:

- Which processes dominate on which temporal and spatial scales?
- Does spatial averaging matter?
- How big are the associated errors?

Mixed layer heat budget and SST

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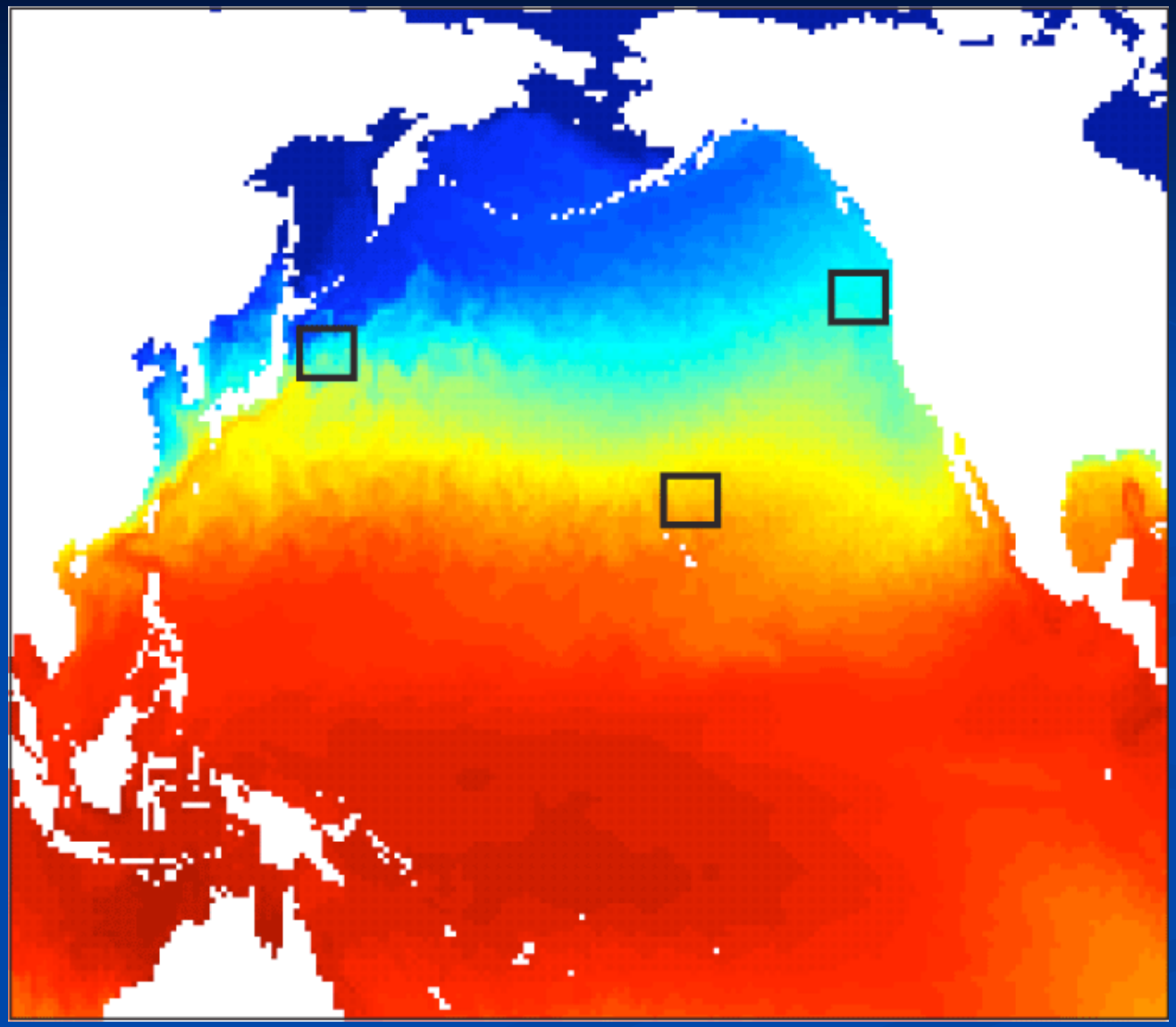
Approach:

- Choose three oceanic regions (approx. 5°x5°) in the North Pacific Ocean:
  - the subtropical gyre
  - an upwelling region off the US West Coast
  - a dynamically active area in the Kuroshio region
- Choose different frequency bands:
  - 6 hourly
  - Daily
  - Monthly



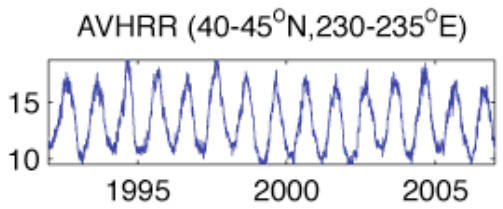
SST variability

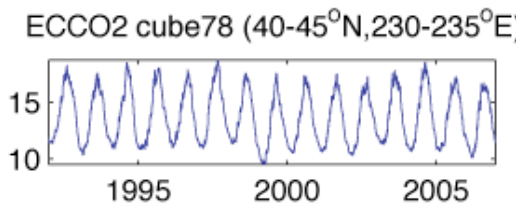
AVHRR ECCO2

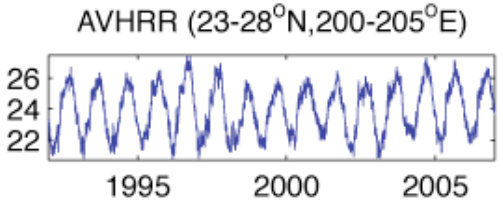
US West Coast

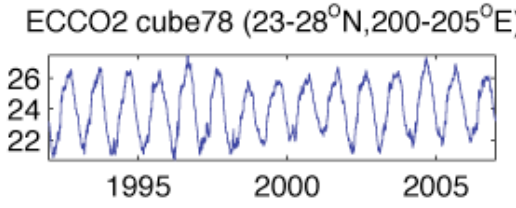
North of Hawaii

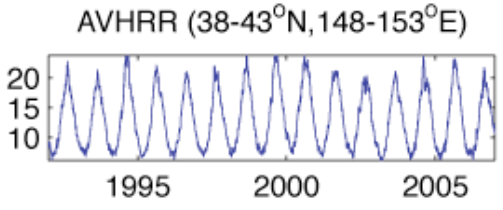
East of Japan

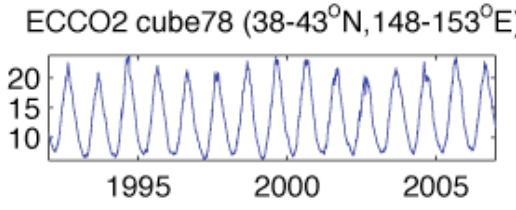












SST anomalies

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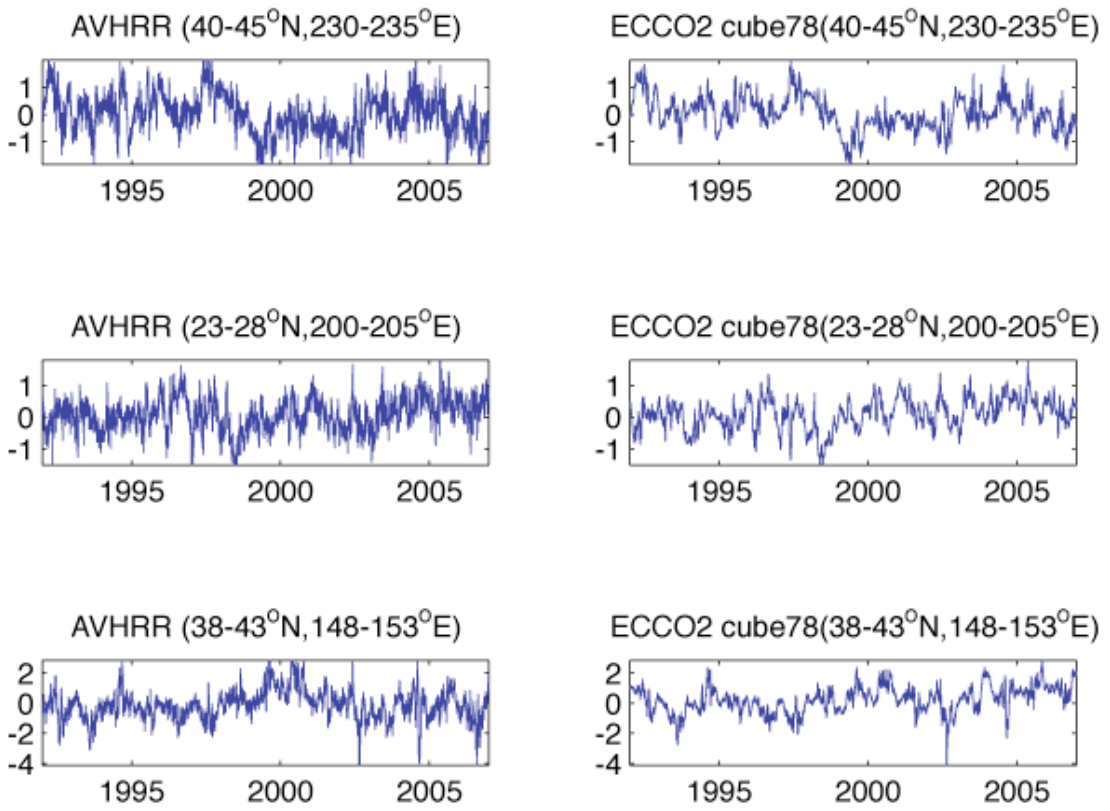

Mixed layer heat budget and SST

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Approach – part 2:

- In a first step calculate ∂T/∂t and the first two terms on the right hand side – treat advection and diffusion as residual

"Technical" questions:

- Which mixed layer depths?
  - KPPmld vs. KPPhbl
  - Other definitions
- Which ΔT?